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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/730,598	12/07/2000	Zining Wu	MP0069	9230
23624	7590	12/21/2004	EXAMINER	
MARVELL SEMICONDUCTOR, INC. INTELLECTUAL PROPERTY DEPARTMENT 700 FIRST AVENUE, MS# 509 SUNNYVALE, CA 94089			LAMARRE, GUY J	
			ART UNIT	PAPER NUMBER
			2133	

DATE MAILED: 12/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/730,598	<b>Applicant(s)</b> WU ET AL.	
	<b>Examiner</b> Guy J. Lamarre, P.E.	<b>Art Unit</b> 2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 07 December 2000 and 29 September 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-190 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-190 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 December 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. 09/302,139.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/30-7/23,30/01</u> . | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

0. Applicant's IDS of 3/30, 7/23 and 7/30/2001 have been entered: it is noted that IDS of 3/30/2001 is a superfluous part of IDS of 730/2001. The Examiner has considered the IDS.

0.1 Pursuant to 35 USC 131, **Claims 1-190** are presented for examination.

### Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

1.1 **Claims 41-52** are rejected under 35 U.S.C. 101 as claiming non-statutory subject matter: a matrix. Applicant is advised to modify limitations of said claims with generating qualifying language/means.

### Specification

2. Title: The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention which the claims are directed to.

2.1 Updated serial/patent numbers are to be updated in the disclosure, in particular on the 1<sup>st</sup> page.

2.1.1 The attempt to incorporate subject matter, e.g., (page 4 line 10, page 10 line 7 et seq.), in passim, into this application by reference is improper because the relevant documents have not been submitted to USPTO. See MPEP 608.01(p).

2.1.2 It is unclear to the **Examiner** why the minimum Hamming distance =2 at, e.g., page 4 line 25, or what is meant by no cycle for period, 'the comprises, in page 6 lines 4, 18, or how an identity matrix of rank four includes only three values of unity on the main diagonal on page 13 equation 8a.

2.2 The abstract should describe the disclosure sufficiently to assist readers in deciding

whether there is a need for consulting the full patent text for details. Instant abstract is not clear, e.g., c=M, tc, M tiers, and 'comprising' needs replacing.

Appropriate correction is required.

### **Drawings**

3. The Drawings are objected to because Figures 1-3, referred to as conventional in the specification, have not been labeled as prior art. Block 502 shall be enclosed in Block 500, Block 500' is not seen in Fig. 1 as described on page 10. Appropriate correction is required.

### **Claim Objections**

4. Claim 167 is objected to for including "method for generating a method. Appropriate correction is required.

### **Claim Rejections - 35 USC § 112**

5. The following is a quotation of the **second** paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5.1 **Claims 1-190** are rejected under the second paragraph of 35 U.S.C. 112 because it is not clear to the **Examiner** what is meant by: cycle-4=0, tc is column height/weight, tiers of element. It is not clear what values Dmin takes on for M>3.

5.2 **Claims 1, 15, 27, 53, 67, 81, 95, 107, 131, 143, 167** and intervening claims are further rejected under the second paragraph of 35 U.S.C. 112 for:

It is unclear to the **Examiner** what hardware component a matrix is in **Claims 1, 15, 27, 53, 67, 81, 167**.

It is unclear to the **Examiner** what is meant by 'from to' in steps (d) of **Claims 95, 131**.

It is unclear to the **Examiner** what is performed in steps (a, c) of **Claims 107, 143**.

### Double Patenting

6. The non-statutory double patenting rejection, whether of the obviousness-type or non-obviousness-type, is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent. In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); In re Van Omum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985) and In re Goodman, 29 USPQ2d 2010 (Fed. Cir. 1993).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(b) and may be used to overcome an actual or provisional rejection based on a non-statutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.78(d).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6.1 Claims 1-190 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 22, 63, 72, 111, 120, 158, 166 of the co-pending US Patent Application No. 09/730,597. Although the conflicting claims are not identical, they are not patentably distinct from each other.

For example, the matrix generator of instant claim 41 is incorporated into the transmission system of copending claim 22. It would have been **obvious** to those in possession of the invention defined by the claims of co-pending US Patent Application No. 09/730,597 to have such matrix generator inclusion. Those in possession of the invention would have been motivated to use matrix generator as recited in claim 22 of the copending Application No. 09/730,597 in order to speed up data processing and reduce data processing hardware.

**6.2** This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### **Claim Rejections - 35 USC § 103**

**7.** The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**7.1** This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

**7.2** **Claims 1-190** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Applicants' Admitted prior art** (hereinafter **Admitted prior art**) and **Tanner** (US Patent No. 4,295,218) in further view of **Roohparvar** (US Patent No. 5,973,900; DATE FILED: July 28, 1995) and **McClure** (US Patent No. 5,493,532).

**As per Claims 1, 15, 27, 41, 53, 67, 81, 95, 107, 131, 119, 131, 143, 155, 167, 179, Admitted prior art** substantially discloses, in page 3 line 4 - page 6 line 5, the claimed means for data communications comprising: means to generate low density parity check matrix wherein is effected parameter selection comprising choice of: matrix size based on minimum Hamming distance, column weight, period/cycle-4, block coding, soft Viterbi/channel coding. {See **Admitted prior art**, Figs. 1-3 and page 3 line 4 - page 6 line 5, in passim, wherein apparatus and method are described.}

**Not specifically described** in detail in **Admitted prior art** is the step whereby parity matrix generation means is effected via a tier arrangement.

**However Tanner**, in an analogous art, discloses plural encoding structures wherein such tier arrangement parity matrix generation techniques are described. {See **Tanner**, Id., Figs. 17,

27-29 and related description, e.g., *‘The third encoder suggested is analogous to the parity check polynomial encoder for a standard cyclic code. Suppose the information bits have been loaded into an eleven bit cyclic shift register. Any bit on the second tier can be computed by summing a subset of the information bits in the cyclic register. Since the graph has cyclic symmetry, all the second tier bits can be computed by cyclically shifting the register. The bits of the remaining three tiers can be obtained in a similar manner by using three different summing circuits connected to the appropriate stages of the information bit shift register. Clearly, the codeword can be computed five bits at a time with an encoder requiring only eleven bits of memory and four different summing circuits.’}*

**Therefore**, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the procedure in the **Admitted prior art** by including therein tier arrangement means as taught by **Tanner**, because such modification would provide the procedure disclosed in **Admitted prior art** with a technique whereby “flexibility and low costs can be achieved since “[t]he *H* matrix for the code must have the same number of non-zero entries in each row, and the same number of non-zero entries in each column. By interpreting each row as a simple parity check subcode, the bipartite graph corresponding to such a code can be formed. It has the special feature that all of the subcode nodes have the same degree (the number of non-zero entries in a row), and all of the digit nodes have the same degree (the number of non-zero entries in a column).” {See **Tanner**, Id., col. 34 line 64 et seq.}

As per Claims 2-14, 16-26, 28-40, 42-52, 54-66, 68-80, 82-94, 96-106, 108-130, 132-142, 144-154, 156-166, 168-178, 180-190, **Tanner/Admitted prior art** discloses functionally equivalent parity matrix partitioning/configuration for optimizing row/column processing. {e.g., see **Tanner**, Id., Fig. 29.}

### Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

8.1 Any response to this action should be mailed to:

Commissioner of Patents and Trademarks, Washington, D.C. 20231

**or faxed to:** (703) 872-9306 for all formal communications.

Hand-delivered responses should be brought to Customer Services, 220 20<sup>th</sup> Street S., Crystal Plaza II, Lobby, Room 1B03, Arlington, VA 22202.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guy J. Lamarre, P.E., whose telephone number is (571) 272-3826. The examiner can normally be reached on Monday to Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert De Cady, can be reached at (571) 272-3819.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-3609.

Information regarding the status of an application may also be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Guy J. Lamarre, P.E.  
Primary Examiner  
11/1/04

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